AMENDMENTS TO THE CLAIMS

1. (Previously presented) A device for ablating an occlusion in a patient's blood vessel, comprising:

a drive shaft adapted to be connected to a rotational driving source;

an ablation burr secured to the drive shaft for rotation therewith, the ablation burr comprising a polymeric balloon section, the polymeric balloon section being expandable from an unexpanded state with a first diameter to an expanded state with a second larger diameter, the polymeric balloon section having an abrasive coating disposed on at least a portion of its exterior surface to ablate an occlusion in a patient's vessel; and

an expansion control system to control the expansion of the burr to a predetermined expanded diameter when in the expanded state.

2. (Previously presented) The device of Claim 1, wherein the expansion control system is embedded within the polymeric balloon section.

3. (Original) The device of Claim 2, wherein the expansion control system comprises fibers arranged in a braided configuration.

4. (Original) The device of Claim 2, wherein the expansion control system comprises a film layer.

5. (Original) The device of Claim 4, wherein the film layer is an expanded Polytetraflouroethylene.

6. (Previously presented) The device of Claim 1, wherein the polymeric balloon section assumes the expanded state when rotated by the drive shaft.

7. (Previously presented) The device of Claim 1, wherein the expansion control system comprises internal curvilinear ribs disposed on the inside surface of the polymeric balloon section.

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1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100

8. (Original) The device of Claim 7, wherein the curvilinear ribs straighten toward a linear configuration to control the expansion of the burr.

9. (Previously presented) The atherectomy device of Claim 1, wherein the polymeric balloon section is post cross-linked, the post cross-linked polymeric balloon section functioning as the expansion control system of the atherectomy device.

10. (Previously presented) The device of Claim 1, wherein the expansion control system comprises a first layer of fiber within the polymeric balloon section disposed in a first direction, and a second layer of fiber within the polymeric balloon section disposed in a second direction that is opposite of the first direction.

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11. (Previously presented) A device for ablating an occlusion in a patient's blood vessel, comprising:

a drive shaft;

an ablation burr secured to the drive shaft, the burr including a nose section having a fixed maximum diameter and an expandable polymeric balloon section having an abrasive disposed on at least a portion thereof, the polymeric balloon section having a diameter that increases as the rotational speed of the drive shaft increases;

wherein the polymeric balloon section includes a system that limits the expansion of the burr to a predetermined maximum diameter.

12. (Previously presented) The atherectomy device of Claim 11, wherein the nose section of the ablation burr having a maximum diameter includes a stepped portion disposed at the proximal end of the nose section and having a substantially constant diameter that is smaller than the maximum diameter of the nose section, and wherein the polymeric balloon section comprises a tube disposed over the stepped portion of the nose section.

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1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100

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13. (Previously presented) The atherectomy device of claim 12, wherein the ablation burr further includes an end section having a fixed maximum diameter, the end section of the ablation burr includes a stepped portion disposed at the distal end of the end section and having a substantially constant diameter that is smaller than the maximum diameter of the end section, the polymeric balloon section disposed over the stepped portion of the end section.

14. (Currently amended) A reverse pull-back device for ablating a lesion in a patient's blood vessel or stent, comprising:

a drive shaft;

an ablation burr secured to the drive shaft, the ablation burr comprising a polymeric balloon section having a proximal end portion and a distal end portion, the polymeric balloon section further having an unexpanded state with a first diameter and an expanded state with a second larger diameter, the polymeric balloon section ~~having~~ including an abrasive coating disposed on the outer surface of the proximal end portion of the polymeric balloon section ~~at least a portion of its exterior surface~~ to ablate a lesion in a patient's vessel or stent;

wherein the balloon section is expandable to create a seal with the vessel or stent when in the expanded state, and wherein the ablation burr includes a smooth section on the distal end portion of the polymeric balloon section so that the ablation burr does not irritate the patient's vessel or stent when the ablation burr is rotating in the expanded state.

15. (Canceled)

16. (Canceled)

17. (Original) The reverse pull-back device according to Claim 14, wherein the device further comprises an aspiration catheter to remove the ablated lesion from the patient's vessel or stent.

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Suite 2800
Seattle, Washington 98101
206.682.8100

16 18. (Currently amended) ~~The reverse pull-back device according to Claim 14~~ A reverse pull-back device for ablating a lesion in a patient's blood vessel or stent, comprising:

a drive shaft;

an ablation burr secured to the drive shaft, the ablation burr comprising a polymeric balloon section, the polymeric balloon section having an unexpanded state with a first diameter and an expanded state with a second larger diameter, the polymeric balloon section having an abrasive coating disposed on at least a portion of its exterior surface to ablate a lesion in a patient's vessel or stent;

C1 Cont wherein the balloon section is expandable to create a seal with the vessel or stent when in the expanded state, and wherein the balloon section unfurls to the expanded state as the drive shaft is rotated.

17 19. (Previously presented) A method for ablating a lesion or occlusion in a patient's vessel or stent comprising:

routing an ablation burr in an unexpanded state over a guide wire to a position distal to the lesion;

rotating a drive shaft to begin the expansion of the ablation bur;

creating a seal between the vessel or stent and the ablation burr by expanding the ablation burr to an expanded state;

pulling the ablation burr in an expanded state proximally toward to the lesion; and

ablating the lesion with the ablation burr as the ablation burr passes through the lesion.

18 20. (Original) The method according to Claim ~~19~~ 17, further comprising the step of removing the ablated material from the patient's vessel or stent through an aspiration catheter.

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Suite 2800
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19 21. (Original) The method according to Claim 17, further comprising the step of deploying a self-expanding seal from within an aspiration catheter after the ablation burr begins to expand.

20 22. (Canceled)

20 23. (Original) A method for ablating a lesion in a patient's vessel or stent with the use of a reverse pull-back ablation system, the ablation system comprising a drive shaft, an aspiration catheter disposed around the drive shaft, and an ablation burr secured to the drive shaft, the ablation burr comprising a polymeric balloon section, the polymeric balloon section having an unexpanded state with a first diameter and an expanded state with a second larger diameter, the polymeric balloon section having an abrasive coating disposed on at least a portion of its exterior surface to ablate a lesion in a patient's vessel or stent, and a lumen extending through the drive shaft and ablation burr for receiving a guide wire, the method comprising:

routing the ablation burr in an unexpanded state over the guide wire to a position distal to the lesion;

rotating the drive shaft to begin the expansion of the ablation bur;

pulling the ablation burr in an expanded state toward a position proximal to the lesion; and

ablating the lesion with the ablation burr as the ablation burr passes through the lesion.

21 24. (Original) The method according to Claim 20, further comprising the step of removing the ablated material from the patient's vessel or stent through the aspiration catheter.

22 25. (Original) The method according to Claim 20, further comprising the step of deploying a self-expanding seal from within the aspiration catheter after the ablation burr begins to expand.

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Suite 2800
Seattle, Washington 98101
206.682.8100

26. (Original) The method according to Claim 23, wherein the ablation bur has a forward cutting surface when in the unexpanded state.

27. (Original) The method according to Claim 23, wherein the step of routing the ablation burr includes cutting a lumen through the lesion so that the ablation burr may be routed to the position distal to the lesion.

28. (Original) A reverse pull-back device for ablating a lesion in a patient's blood vessel or stent, comprising:

a drive shaft;

an ablation burr secured to the drive shaft, the ablation burr comprising a polymeric balloon section, the polymeric balloon section having an unexpanded state with a first diameter and an expanded state with a second larger diameter, the polymeric balloon section having an abrasive coating disposed on at least a portion of its exterior surface to ablate a lesion in a patient's vessel or stent; and

an aspiration catheter disposed around the drive shaft to remove the ablated material from the lesion.

29. (Previously presented) The reverse pull-back device according to Claim 28, wherein the polymeric balloon section has a distal end portion and a proximal end portion and includes a wire mesh disposed within the polymeric balloon section, the wire mesh beginning at the proximal end portion of the balloon section and extending to about the midpoint of the ablation burr so that the proximal end portion of the balloon section forms a concave shaped portion in the expanded state.

30. (Previously presented) The reverse pull-back device according to Claim 29, wherein the abrasive is coated on the wire mesh in the expanded state.

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1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100

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28 31. (Original) The reverse pull-back device according to Claim 28, further comprising a self-expanding seal coupled to the aspiration catheter.

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29 32. (Previously presented) The reverse pull-back device according to Claim 28, wherein the ablation bur forms a forward cutting surface when in the unexpanded state.

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CHRISTENSEN O'CONNOR JOHNSON KINDNESS PLLC
1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100